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I, the undersigned, hereby declare that the annexed document is an accurate English translation of the below-identified document, that the translation was duly made by me, and that I am fully familiar with both English and Japanese, for which I will assume any responsibility:

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A handwritten signature in black ink, appearing to read "K. Terajima", written over a horizontal line.

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[Title of the Invention] PERFORMANCE INFORMATION
REPRODUCING APPARATUS AND PROGRAM
[Claims for the Patent]

5 [Claim 1]

A performance information reproducing apparatus
characterized by comprising:

file storage means that stores a musical tone data
file, in which musical tone information is recorded, and
10 a media data file, in which another type of media
information is recorded, together with a management file
in which reading manners of these data files are
recorded; and

reproduction data generating means that generates,
15 based on the musical tone data file and the management
file, reproduction data that designates the musical tone
information and the media data file to be reproduced, in
a same format as the reading of the musical tone
information.

20 [Claim 2]

A performance information reproducing apparatus as
claimed in claim 1, characterized by further comprising:

reproduction data storage means that stores the
generated reproduction data;

25 reading means that reads the reproduction data from
said reproduction storage means in accordance with
reproduction clock for the musical tone by a musical tone
information reproducing program; and

reproducing means that reads the media data file
30 designated by the read reproduction data from the file
storage means, and independently reproduces the musical
tone information in the reproduction data and the read
media information in the media data file.

[Claim 3]

35 A performance information reproducing program for

causing a information processing apparatus which comprises file storage means that stores a musical tone data file, in which musical tone information is recorded, and a media data file, in which another type of media
5 information is recorded, together with a management file in which reading manners of these data files are recorded, to execute a procedure, the procedure comprising:

a step of generating, based on the musical tone data file and the management file, reproduction data that
10 designates the musical tone information and the media data file to be reproduced, in a same format as the reading of the musical tone information;

a step of storing the generated reproduction data;
and

15 a step of reading the stored reproduction data.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to a performance information
20 reproducing system that reproduces a plurality of types of performance information (media information) in synchronism with each other, and in particular to a performance information reproducing system that are designed to generate reproduction data used to read out
25 performance information to be reproduced in synchronism with each other.

[0002]

[Conventional Art]

Conventionally, there is known an apparatus which
30 generates data for synchronized reproduction of a plurality of types of data, such as music and images, in timing in which musical performance is given and carries out synchronized reproduction of such various types of data based on the generated data, as disclosed by Patent
35 Document 1, for example.

[0003]

[Patent Document 1] Japanese Laid-Open Patent Publication (Kokai) No. H06-124093.

[0004]

5 However, the conventional apparatus generates such various types of data in advance so that the data will be reproduced in accordance with the timing of musical performance, and therefore there is the problem that it is difficult to change some of such data or to add a new
10 type of data.

[0005]

[Problems to be Solved by the Invention]

 In view of the above mentioned problem, it is a main object of the present invention to provide a performance
15 information reproducing system that are capable of realizing desired synchronized reproduction of a plurality of types of performance information (media information), such as music and images with ease by easily generating reproduction data used to retrieve each
20 of various performance information files in accordance with management data that specifies reproducing manners of the various performance information files and retrieving a file using the reproduction data when the synchronized reproduction is performed.

25 [0006]

[Means for Solving the Problems]

 According to the main features of the present invention, there is provided a performance information reproducing apparatus (PC, ED) comprising file storage
30 means (3, 4F) that stores a musical tone data file (MF), in which musical tone information is recorded, and a media data file (AF, VF), in which another type of media information is recorded, together with a management file (MN) in which reading manners of these data files (MF-VF)
35 are recorded, and reproduction data generating means (MPa,

VPa; M4-M10) that generates, based on the musical tone data file (MF) and the management file (MN), reproduction data (RD) that designates the musical tone information and the media data file (MF-VF) to be reproduced, in a same format as the reading of the musical tone information [claim 1], and a performance information reproducing program for causing a information processing apparatus (PC, ED) which comprises file storage means (3,4F) that stores a musical tone data file (MF), in which musical tone information is recorded, and a media data file (AF, VF), in which another type of media information is recorded, together with a management file (MN) in which reading manners of these data files (MF-VF) are recorded, to execute a procedure comprising a step (M4-M10; MPa, VPa) of generating, based on the musical tone data file (MF) and the management file (MN), reproduction data (RD) that designates the musical tone information and the media data file (MF-VF) to be reproduced, in a same format as the reading of the musical tone information, a step (M4-M12; MPb, VPa, 2M, 2V) of storing the generated reproduction data (RD), and a step (MPd, MPe) of reading the stored reproduction data (RD) [claim 3]. Note that reference symbols or the like of corresponding embodiments are shown in the parentheses. [0007]

Moreover, the performance information reproducing apparatus (PC, ED) may further comprise reproduction data storage means (M4-M12; MPb, VPa, 2M, 2V) that stores the generated reproduction data (RD), reading means (MPd, MPe) that reads the reproduction data (RD) from said reproduction data storage means (2M, 2V) in accordance with reproduction clock for the musical tone (MC) by a musical tone information reproducing program, and reproducing means (MPd, APa, VPc) that reads the media data file (AF, VF) designated by the read reproduction

data (RD) from the file storage means (3, 4F), and independently reproduces the musical tone information in the reproduction data (RD) and the read media information in the media data file (AF,VF) [claim 2].

5 [0008]

[Operation]

In a performance information reproduction apparatus (PC, ED) according to the present invention, data files (MF, AF, VF), in which various types of media information
10 are recorded respectively, are stored in file storage means (3, 4F) together with management files (MN) for managing the reproduction manners of the data files (MF-VF). Such media information includes musical tone information that is in a predetermined format, such as
15 MIDI (Musical Instrument Digital Interface) standard and can be reproduced according to a musical tone information reproducing program, such as MIDI reproducing program, and one or more of other type media information that is reproduced according to corresponding reproducing program,
20 for example sound wave information, such as audio data, or video information, such as video data.

[0009]

When reproduction of such various media information, as the performance information, is carried out, a
25 reproduction data generating function (MPa; M4-M10) of the performance information reproducing apparatus (PC, ED) generates, in accordance with the management file (MN), reproduction data (RD) which allows the musical tone information of the musical tone data file (MIDI file
30 MF) and the other media data files (audio and video files AF, VF) to be read according to a musical tone information reproducing program (MIDI reproducing program). Then, the musical tone information of the musical tone data file (MF) and each of media data files
35 (AF, VF) are read out based on the reproduction data (RD),

and the musical tone information and the other media information are independently reproduced by the respective media reproduction programs (MIDI reproduction program, audio reproduction program, and video reproduction program) (MPd, APa, Vpc).
[0010]

Therefore, without carrying out difficult processing such as specially generating various media information in advance so that the media information is reproduced in accordance with reproduction timing of musical tone information, when reproduction is carried out, the management file (MN) is used to easily generate reproduction data (RD) for reading the various media information and the various media information can then be read out in accordance with the reproduction data (RD) only by setting read manners (filenames, timing, and the like) for various media information in advance in a management file (MN). As a result, synchronized reproduction of media information can be realized with ease. Further, an editing operation for a management file (MN) that specifies reproducing manners of the various media information is simple, so that by editing the management file (MN), for example, to change some of the data files or add new data files, or to change the reproduction timing of respective media files, it is possible to flexibly set a desired reproducing manner.
[0011]

[Embodiments of the Invention]

Embodiments of the present invention will now be described in detail below with reference to the accompanying drawings. It should be noted that the embodiments described below are merely examples, and that a variety of modifications are possible without departing from the scope of the present invention.

[0012]

[System Configuration]

FIGS. 1 show examples of the entire construction of a performance information reproduction systems according to an embodiment of the present invention. In such a performance information reproduction system, it is possible to use any information processing apparatus insofar as it has a communication function and a performance information processing function. FIGS. 1 show two typical examples of how such apparatus is applied.

[0013]

In an example of FIG. 1(1), a personal computer PC with a communication function is used in a performance information reproducing apparatus. Various media information (hereinafter also referred to as "performance information") such as musical tone information and image information is distributed from a server computer SV to the personal computer PC via a universal communication network such as the Internet. The personal computer PC is provided with control programs including a management program and a variety of dedicated media information reproducing programs corresponding to various kinds of media information. In accordance with these programs, the personal computer generates reproduction data (RD), which enables synchronized reproduction of the various media information, and reads out the various media information based on the generated reproduction data (RD) and carries out synchronized reproduction of the same.

[0014]

Next, out of such reproduction outputs, image output is supplied to a display section of the personal computer PC so that images corresponding to the media information are generated, and sound output is supplied to a dedicated information processing apparatus EM dedicated to musical tones with a musical tone generating function,

such as an electronic musical instrument so that sounds corresponding to the media information are generated. It should be noted that the personal computer PC is equipped with a tone generator and a sound system or the like, and hence has a function of outputting sounds based on musical tone information or the like, so that the personal computer PC itself may generate sounds and images corresponding to the various media information without using a separate information processing apparatus EM for outputting sounds, such as an electronic musical instrument.

[0015]

On the other hand, in an example of FIG. 1(2), an information processing apparatus ED dedicated to musical tones, such as an electronic musical instrument, is used in a performance information reproducing apparatus. This information processing apparatus ED has not only a musical tone information processing function but also a general communication function and various media information processing functions that are based on control programs such as a management program and various kinds of reproducing programs. Various kinds of media information are distributed from the server SV via a universal communication network. In accordance with these programs, the information processing apparatus ED generates reproduction data (RD) which enables synchronized reproduction of the various media information, and reads out the various media information based on the generated reproduction data (RD) and carries out synchronized reproduction of the same to generate sound and images corresponding to the various media information.

[0016]

It should be noted that the performance information reproducing apparatus is not limited to the personal

computer PC and the information processing apparatus ED, such as an electronic musical instrument as shown in FIGS. 1(1) and 1(2), but various types of information processing apparatuses that have the same functions as theirs can be used. In the embodiments described below, the case where the performance information reproducing apparatus (PC, ED) itself has a function of outputting sound is described.

[0017]

FIG. 2 is a block diagram showing an exemplary hardware construction of the performance information reproducing apparatus according to the embodiment of the present invention. This performance information reproducing apparatus is comprised of a central processing unit (CPU) 1, a random access memory (RAM) 2, a read only memory (ROM) 3, an external storage device 4, a detection circuit 5, a display circuit 6, a tone generator circuit 7, an effect circuit 8, a communication interface (communication I/F) 9, and the like, with these components 1 to 9 being interconnected via a bus 10.

[0018]

The CPU 1 that controls the entire apparatus executes various performance information reproduction processes in accordance with predetermined control programs. The RAM 2 functions as a processing buffer for temporarily storing various information used in such processes, and is comprised, for example, of a contents buffer (2C), a reproduction data buffer (2M), a video reproduction data (video control data) buffer (2V), and the like. Control programs for causing the CPU 1 to execute the performance information reproduction processes and various data, tables, and the like are stored in the ROM 3. Such control programs include performance information reproducing programs such as a management program (CP), a MIDI reproducing program (MP),

an audio reproducing program (AP), a video reproducing program (VP), and a score reproducing program (SP).

[0019]

5 The external storage device 4 is a storage means
that uses a storage medium such as a hard disk (HD), a
compact disc read only memory (CD-ROM), a flexible disk
(FD), a magneto-optical disk (MO), a digital versatile
disc (DVD), or a memory card. Various control programs
related to performance information reproduction and
10 various data can be stored not only in the ROM 3 but
additionally or alternatively in the external storage
device 4. For example, when a control program is not
stored in the ROM 3, by storing the control program in
the external storage device 4, such as an HD or a CD-ROM,
15 and loading the program into the RAM 2, the CPU 1 can be
made to execute the same operation as in the case where
the control program is stored in the ROM 3. It is also
possible to implement the performance information
reproducing apparatus by installing a performance
20 information reproducing program as a control program in
the external storage device 4, which is an HD or the like.
By doing so, it becomes easy to add and/or to update or
upgrade the control programs.

[0020]

25 The detection circuit 5 introduces operation
contents of various operators of an operator device 11
connected to the detection circuit 5 into the system.
The operator device 11 is comprised of various setting
panel operators such as a character keyboard and a
30 pointing device (such as a mouse), and when the
performance information reproducing apparatus is the
electronic musical instrument ED, also includes
performance operators enabling the user to input
performance sounds.

35 [0021]

The display circuit 6 controls display contents of a display section 12 connected thereto according to commands from the CPU 1. The display section 12 is comprised of a display for displaying various screens, such as a performance information reproduction screen. This performance information reproduction screen is also called "page screen", and the display state thereof is controlled in accordance with the management program (CP), the video reproducing program (VP), the score reproducing program (SP), and the like.

[0022]

The tone generator circuit 7 outputs musical tone wave information corresponding to musical tone information, and the effect (applying) circuit 8, which is comprised of a DSP or the like, converts the musical tone wave information and sound wave information into desired sound signals. A sound system 13, which is comprised of a D/A converter, an amplifier, and a speaker, is connected to the effect circuit 8, so that sound signals based on the musical tone information and the sound wave information generated in accordance with the MIDI reproducing program (MP) and/or the audio reproducing program (AP) are converted into analog signals, which are amplified, and outputted as sounds by the sound system 13.

[0023]

The communication I/F 9 is the interface (I/F) that connected to a universal communication network such as a local area network (LAN), the Internet, or a telephone line, or connected to a MIDI network for communication with other MIDI apparatuses. Via these networks, various information can be sent to and received from external apparatuses as necessary. For example, various control programs and data can be obtained from an external information processing apparatus and musical tone

information such as MIDI data can be obtained from an external MIDI apparatus. For example, as described above, in the case where necessary control programs, data, or the like are not stored in the ROM 3 or the external storage device 4, such control programs, data, or the like can be downloaded from the server computer SV or the like via the communication network.

[0024]

[Contents]

10 In the performance information reproducing apparatus according to the embodiment of the present invention, a number of contents files (hereinafter also referred to simply as "contents") for performance information reproduction are provided in a contents filing section 4F
15 of the external storage device 4. These contents may be obtained from the server SV mentioned above or external information processing terminals, or may be generated by editing various data obtained by the present performance information reproducing apparatus. Also, in the case
20 where contents files are stored in advance in the ROM 3, such contents files may be used for performance information reproduction.

[0025]

FIG. 3 shows the exemplary structures of contents
25 files used for performance information reproduction and the management data in the contents files according to the embodiment of the present invention. In the following description, it is assumed that information according to MIDI standard is used as the musical tone
30 information and the like.

[0026]

As shown in the leftmost column in FIG. 3, a plurality of contents files CF1, CF2, ..., CFn are provided as contents for use in the performance information
35 reproducing apparatus. As shown in the second column

from the left, the contents files CF each include a management file MN, and a plurality of types of media data files MF, AF, VF, and SF. It should be noted that the following description, the symbol "CF" represents the contents files as a whole, and the symbol "CFi" generally represents any single contents file. In the same way, the symbol "MNi" generally represents the management file of the contents file CFi.

[0027]

10 In the illustrated example, the media data files (hereinafter simply "media files") are each comprised of a MIDI file (musical tone information file) MF, an audio file (sound wave information file) AF, a video file (image information file (VF), and a score file SF. A
15 single contents file CF includes a plurality of MIDI files MF11, MF12, ..., audio files AF11, AF12, ..., video files VF11, VF12, ... and score files SF11, SF12, ... (each reference symbol corresponds to the first contents file CF1). It should be noted that the following description,
20 the symbols "MF", "AF", "VF", and "SF" represent respective media files as a whole and the first suffix "i" that follows these symbols "MF", "AF", "VF", and "SF" generally indicates the media file corresponding to any contents file CFi.

25 [0028]

As shown in the third column from the left in FIG. 3, a management file MN for each piece of contents (there is one management file per each piece of contents) is comprised of a plurality of page data PD1, PD2, ... with
30 each page data having a plurality of group data Gd11, Gd12, ..., Gd21, Gd22, Each group data (one reproduction part data) Gd is set on a group-by-group basis, each group (k) being a unit by which a user can separately designate media files to be reproduced using
35 that group data Gd. Each group (k) is also referred to

as "one reproduction part".

[0029]

Each group data (single reproduction part) Gd represents a "blueprint" of reproduction data in one reproduction part expressed in a user-definable page description language, such as XML (eXtensible Markup Language) and, as shown in an upper part of the rightmost column in FIG. 3, is comprised of control instruction (display instruction) information Cd and a plurality of media file designation information Md, Ad, Vd, and Sd. The media file designating information Md, Ad, Vd, and Sd are for designating media files MF, AF, VF, and SF to be reproduced corresponding to that group data (one reproduction part) Gd on a group-by-group (reproduction part) basis.

[0030]

The control instruction information (display instruction information) Cd includes display instruction information designating a display state such as display size and display position for each of data designated for reproduction by the present group (present reproduction part) (k) to be displayed on a page screen of the display section 12. The control instruction information also includes display data for the title of the group, brief comments, and the like. The display data may include the name and initial still image of a media file to be displayed first in a display area (window) for the designated media data. The control instruction information Cd may also include setting information such as timing setting information for setting MIDI clock timing in the case where information, such as MIDI file designation information Md that specifies MIDI clock timing is not present.

[0031]

In the illustrated example, the MIDI file

designation information Md, audio file designation information Ad, video file designation information Vd and score file designation information Sd are included as the media file designation information. A MIDI file, an
 5 audio file, a video file, and a score file MF, AF, VF, and SF to be reproduced are designated by the media file designation information Md, Ad, Vd, and Sd on a group (reproduction part) (k) on a group-by-group (reproduction part) basis.

10 [0032]

As shown in the lower part of the rightmost column in FIG. 3, out of the media file designation information, the audio file designation information and video file designation information (for one reproduction part) Ad,
 15 Vd that designate audio and video files AF, VF are comprised of pairs of designated filename data Fn1, Fn2, ..., and timing data Tm1, Tm2 indicative of timing in which reproduction of the audio file and the video file AF, VF designated by the filename data Fn1, Fn2, ... is to start,
 20 with such pairs being arranged in the order of reproduction start timing. Each timing data Tm1, Tm2, ... can designate the reproduction start timing of the designated video file VF using any desired method, such as by designating a number of bars and a number of beats.

25 [0033]

Next, FIG. 4 shows the exemplary structure of each media file (single file). Each contents file CFi includes a plurality of types of media files. As shown in the left column in FIG. 4, for example, the types of
 30 media files are the MIDI file, the audio file, the video file, and the score file MF, AF, VF, and SF as mentioned above. These media file types are each comprised of a file group MFi, AFi, VFi, or SFi of a plurality of files MFi1, MFi2, ... , AFi1, AFi2, ... , VFi1, VFi2, ... , or SFi1,
 35 SFi2, ...

[0034]

As shown in an upper-left part of FIG. 4, each MIDI file (single file) MFia (where reference symbol "a" represents an arbitrary file in a file group i, and it is shown as the contents of a first MIDI file MFi1(a=1) in the file group i in the drawing) is comprised of a master track CT and a reproduction track RT. The master track CT has recorded therein basic data (for example, tempo, key, and composer name) relating to musical tone information (musical composition information) of the MIDI file (single file) MFi. The reproduction track RT has recorded therein the contents of that musical tone information (musical composition information). That is, as shown in the uppermost part of the right column in FIG. 4 (in which the contents of the reproduction track RT of the first MIDI file MFi1 are shown), the musical tone information (musical composition information) is comprised of pairs of MIDI clock timing MC11, MC12, ..., and MIDI events EV11, EV12, ... occurring in the MIDI clock timing MC11, MC12, ... are arranged in the order of the MIDI clock timing.

[0035]

As shown in the second part of the right column (in which the contents of the first audio file AFi1 in FIG. 4 are shown), each audio file (single file) AFia is comprised of a plurality of audio samples AS11, AS12, AS13 that are arranged in the order of reproduction, with the consecutive audio samples AS11, AS12, AS13 representing sound information such as voices, instrument sounds, and natural sounds as waves.

[0036]

As shown in the third part of the right column (in which the contents of the first video file VFil in FIG. 4 are shown), each video file (single file) VFia is comprised of a plurality of video frames FR11, FR12, FR13,

... that are arranged in the order of reproduction. Each video frame FR11, FR12, FR13, ... may represent an image (scene) that is independent of other video frames, like a still image, or may represent an image (scene) that is related to preceding and succeeding frames as in a moving image (animation).

[0037]

As shown in the lowest part of the right column (in which the contents of the first score file SF11 in FIG. 4 are shown), each score file (single file) SFia is comprised of pairs of display positions DP11, DP12, ... (of a changeable score display part) on a score represented by score information in the score file SF, and score events SE11, SE12, ... that occur at the respective corresponding display positions DP11, DP12, ..., with the pairs being arranged in the order of display positions.

[0038]

[Setting Operation and Generation of Reproduction Data]

Whenever performance information reproduction is carried out, the performance information reproducing apparatus according to the embodiment of the present invention enters a setting operation mode, in which reproduction data RD for synchronized reproduction of the media information in respective files MF, AF, VF, and SF is generated from the MIDI file MF and other types of media files such as audio, video, and score files AF, VF, SF. Then, the apparatus enters a reproduction operation mode, in which the reproduction data RD is used to reproduce the other media information in the other media files Af, VF, and SF in a reproducing manner according to the contents of the management file MN, in synchronism with reproduction of musical tones according to the musical tone information in the MIDI file MF. FIG. 5 is a functional block diagram [1] schematically showing functions used in the setting operation mode of the

performance information reproducing apparatus according to the embodiment of the present invention. In FIG. 5, broken lines represent parts that are activated to function in the reproduction operation mode (described later with reference to FIG. 12).

[0039]

Now, a brief description will be given of the functions of the performance information reproduction system according to the embodiment of the present invention with reference to FIG. 5. In this performance information reproduction system, various types of media information (performance information) data files MF, AF, VF, and SF are stored in the contents filing section 4F or the like together with management files MN that manage the reproduction manners of the data files MF-SF. When synchronized reproduction of such media information is carried out, whenever reproduction is to be performed, first a reproduction data generating part MPa, etc. of a musical tone information (MIDI) reproducing program executing section MP generates, in accordance with the management file MN, reproduction data RD in the state for enabling musical tone (MIDI) data files and score data files MF, SF, and various other media (audio/video) data files AF, VF to be read out according to a musical tone information reproducing program. Then, reproducing parts of respective media information reproducing program executing sections MP, SP; AP, VP reproduce the musical tones and score information of the generated reproduction data RD and also the other media information of the other media data files AF, VF read out based on the reproduction data RD.

[0040]

This will be described more in detail below. As shown in FIG. 5, this performance reproduction system is comprised of a management program (browser program)

executing section CP that manages the progress of the respective media information, and a plurality of media information reproducing program executing sections that carry out reproduction operations for respective media information independently in accordance with instructions from the management program executing section CP. For example, these media information reproducing program executing sections are comprised of the above-mentioned MIDI reproducing program executing section, an audio reproducing program executing section, a video reproducing program executing section, and a score reproducing program executing section MP, AP, VP, and SP. [0041]

The management program (browser program) executing section CP carries out management control of respective files in accordance with the management program stored in the ROM 3 to manage the contents buffer 2C provided in the processing buffer (RAM) 2. Also, during a setting operation by the performance information reproducing apparatus, a read processing section CPa, a distribution processing section CPb and a page screen display processing section CPc actively function. [0042]

The MIDI reproducing program executing section MP operates in response to control instructions from the management program executing section CP to process performance information of a predetermined MIDI file MF in accordance with the MIDI reproducing program, and manages the reproduction data buffer 2M reserved in the processing buffer 2. The MIDI reproducing program executing section MP also performs control required for processing related to other media files AF, VF, and SF, and during a setting operation by the performance information reproducing apparatus, activates modular functions of the reproduction data generating section MPa

and a reproduction data storage section MPb.

[0043]

Based on control instructions from the management
program executing section CP and information from the
5 MIDI reproducing program executing section MP, the audio
reproducing program executing section and the video
reproducing program executing section AP, VP process,
respectively, sound wave information of a designated
audio file AF and image information of a designated video
10 file VF according to the audio reproducing program and
the video reproducing program. During a setting
operation by the performance information reproducing
apparatus, the audio reproducing program executing
section AP does not have an activated module, but the
15 video reproducing program executing section VP has a
video reproduction data conversion/storage section VPa
activated. The video reproducing program executing
section VP also manages a video control data buffer 2V in
the processing buffer 2.

20 [0044]

Based on control instructions from the management
program executing section CP and information from the
MIDI reproducing program executing section MP, the score
reproducing program executing section SP processes score
25 information of a designated score file AF according to
the score reproducing program. During a setting
operation by the performance information reproducing
apparatus, the score reproducing program executing
section SP activates functions of a score display
30 processing section SPa and a score reproduction data
generating section SPb.

[0045]

Next, a description will be given of (1) a setting
process carried out by the management program executing
35 section CP, (2) processing by the respective reproducing

program executing sections MP, AP, VP, and SP in the setting operation mode, and (3) a MIDI generation process carried out by the MIDI reproducing program executing section MP in that order with reference to FIGS. 6 to 11.

5 [0046]

(1) Setting Process by Management Program Executing Section CP

The setting process by the management program executing section CP is carried out during a setting operation by the performance information reproducing apparatus. A user sets the apparatus into the setting operation mode and designates a desired contents number (i) and a page (j) in the contents (i) by operating a predetermined operator of the operator device 11 in response to a contents menu with a tree structure that has been displayed in a guide screen on the display section 12. Responsive to this designation, the read processing section CPa of the management program executing section CP first reads a single contents file CFi corresponding to the designated content number "i", out of the contents files CF1 to CFn recorded in the contents filing section 4F of the external storage device 4 and a contents storage area of the ROM 3, that is, reads a management file MNi, MIDI files MFi, audio files AFi, video files VFi, and score files SFi included in the contents CFi and stores the files in the contents buffer 2C.

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[0047]

Next, the distribution processing section CPb initializes all group data Gdj1, Gdj2, ... included in page data PDj corresponding to the designated page j to display the initialized data in the page screen display processing section CPc. That is, the data distribution processing section CPb reads out all the group data Gdj1, Gdj2, ... of the page j from the management file MNi of the

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contents file CFi stored in the contents buffer 2C and sends the readout data to the page screen display processing section CPc.

[0048]

5 The page screen display processing section CPc determines, based on the display instruction information Cd for all groups (the initialized all groups Gdji, Gdj2, ...)

10 in the page j, arrangement positions and display states of media information and the like to be displayed on the display screen, and displays a page screen in accordance with all the group data Gdji, Gdj2, ... on the display section 12 in an arrangement shown in FIG. 7, for example. Although a media display window for displaying media information such as video images and score images

15 (drawing) for the groups is blank in FIG. 7, there is also the case where media initial display data prepared in advance in the display instruction information Cd is displayed. It should be noted that a title of a group and brief comments provided by the display instruction

20 information Cd are displayed in the display area (window) marked "other display" in FIG. 7.

[0049]

 The distribution processing section CPb transfers score files (for one page) designated by the score file

25 designating information Sd of all of the group data Gdji, Gdj2, ... to the score reproducing program executing section SP. The score reproducing program executing section SP generates score display information (image data or drawing data for a score static display part)

30 representing respective group scores of the transferred score files (for one page) SFi, and transfers the score display information to the page screen display processing section CPc. Responsive to this, the page screen display processing section CPc carries out processing of

35 incorporating static score images expanded based on the

score display information into respective group score display areas in the page screen to thereby display a score image SC such as one shown as a first group (reproduction part) of the page screen in FIG. 7. It should be noted that in the page screen shown in FIG. 7, the score image SC is displayed simply using only a staff, with a second and subsequent pages also being simplified and displayed on a reduced scale. Also, by operating a scroll button in the operator device 11, the user can scroll this page screen to have a desired group displayed. [0050]

Here, if the user refers to the display of the page screen and performs an operation to designate a desired group (reproduction part) "k" to be reproduced out of all the initialized groups 1, 2, ... for the present page j, the distribution processing section CPb transfers, to the MIDI reproducing program executing section MP, a part of the management data MNi corresponding to the designated reproduction part, that is, group data Gdjk of the designated page data PDj corresponding to the group k, and a MIDI file MFia (where "a" represents an individual file designated within the MIDI files MFi) for one reproduction part designated by the MIDI file designation information Md of the group data Gdjk, and also transfers the control designation information Cd and the video file designation information Vd of the part of the management data MNi corresponding to the designated reproduction part, that is, the group data Gdjk, to the video reproducing program executing section VP. [0051]

FIG. 6 is a flowchart showing the procedure of the setting process (browser process) carried out by the management program executing section CP mentioned above. When the setting process (browser process) is started in accordance with the management program, first the read

processing section CPa reads the designated contents CFi from the contents filing section 4F and records the contents CFi in the contents buffer 2C (step C1). Then, the data distribution processing section CPb reads all of
 5 the group data Gdj1, Gdj2, ... in the page data PDj of the designated page from the management file MNi of the content CFi recorded in the contents buffer 2C, and causes the page screen display processing section CPc to display a page screen in accordance with the group data
 10 Gdj1, Gdj2, ... on the display section 12 (step C2).
 [0052]

The data distribution processing section CPb also reads the score file designation information Sd from all of the group data Gdj1, Gdj2, ... and sends the score file
 15 SFia designated by the score file designation information Sd to the score reproducing program executing section SP (step C3). Responsive to this, the score reproducing program executing section SP generates score display information and sends the score display information to
 20 the management program executing section CP, which receives the score display information and displays scores in corresponding areas on the page screen based on the score display information (step C4). In this way, the scores SC of all of the groups (1, 2,...) included in
 25 the designated page (j) are displayed (see FIG. 7. Note that FIG. 7 shows only a simplified display and that at this stage, a cursor CL is not shown.)
 [0053]

Here, if the user performs an operation to designate
 30 or change a group k to be reproduced, the newly designated or changed group k is set as an object to be reproduced and the following process is carried out for the group data Gdjk corresponding to the group k. First, processing for detecting file types (MF, AF, VF, SF) to
 35 be used in the reproduction from the group data Gdj1,

Gdj2, ... that have been initially designated is carried out (step C5).

[0054]

First, it is determined from the designation
 5 contents of the MIDI file designation information Md
 whether a MIDI file (MF) should be used for reproduction
 (step C6), and when a MIDI file (MF) should be used for
 reproduction ("YES" to the step C6), the group data Gdj_k
 and a MIDI file MF_{ia} used for the group *k* are sent to the
 10 MIDI reproducing program executing section MP (step C7).
 When it is determined that no MIDI file (MF) should be
 used for reproduction ("NO" to the step C6), the group
 data Gdj_k is sent to the MIDI reproducing program
 executing section MP (step C8).

15 [0055]

After the data has been transmitted to the MIDI
 reproducing program executing section MP in this way
 (steps C7, C8), the designation contents of the file
 designation information Vd is checked to determine
 20 whether it has been detected that a video file (VF)
 should be used for reproduction (step C9). Here, when it
 is determined that a video file (VF) should be used for
 reproduction ("YES" to the step C9), processing for
 sending the video file designation information Vd in the
 25 group data Gdj_k to the video reproducing program
 executing section VP is carried out (step C10), and then
 the setting process (browser process) is terminated. On
 the other hand, when it is determined that no video file
 (VF) should be used for reproduction ("NO" to the step
 30 C9), the setting process is terminated immediately.

[0056]

(2) Processing by Respective Reproducing Program
 Executing Sections MP to SP In Setting Operation Mode

Next, the operations of the respective media
 35 information reproducing program executing sections MP to

SP in the setting operation mode of the performance information reproducing apparatus will be described. In FIG. 5, first, in the score reproducing program executing section SP, the score display processing section SPa
 5 generates the score display information (image data or drawing data for the score static part) based on the score file SFi (for one page) sent from the data distribution processing section CPb of the management program executing section CP as described above, and
 10 transfers the score display information to the page screen display processing section CPc of the management program executing section CP. Further, the score reproduction data generating section SPb generates score reproduction data by extracting a data part of a movable
 15 display part (note/rest event) of the score, out of the score information of one reproduction part of the score file SFi (for one page) corresponding to the group k, and transfers the generated score reproduction data to the reproduction data generating section MPa of the MIDI
 20 reproducing program executing section MP.
 [0057]

In the MIDI reproducing program executing section MP, the reproduction data generating section MPa generates
 25 audio reproduction data and MIDI reproduction data based on one reproduction part (group data) Gdjk of the management file Mni and the MIDI file MFia of one reproduction part transferred from the distribution processing section CPb, and also generates reproduction
 30 data RD as shown in FIG. 8(a), for example, by combining the above generated data with the score reproduction data from the score reproduction data generating section SPb. The reproduction data RD generated by the reproduction data generating section MPa is stored in the reproduction data buffer 2M by the reproduction data storage section
 35 MPb.

[0058]

The reproduction data generating section MPa generates audio reproduction data ATr synchronous with MIDI clock timing based on the audio file designation information Ad (see FIG. 3) of the designated group data Gdjk of the management file MNi. As is learned from this, during a setting operation by the image information reproducing apparatus, the audio reproducing program executing section AP receives no data distributed from the distribution processing section CPb, and therefore the audio reproducing program executing section AP does not carry out any processing on contents data.

[0059]

On the other hand, as for the video file designation information Vd (see FIG. 3), to reduce a burden upon the reproduction data generating section MPa of the MIDI reproducing program executing section MP, the video file designation information Vd (see FIG. 3) is processed by the video reproduction data conversion/storage section VPa of the video reproducing program executing section VP in this example. That is, the video reproduction data conversion/storage section VPa generates video reproduction data VTr as shown in FIG. 8(b) from the video file designation information Vd of one reproduction part (the designated group data Gdjk of the management file MNi) distributed from the distribution processing section CPb, and stores the generated video reproduction data VTr in the video control data buffer 2V.

[0060]

The reproduction data RD generated by the reproduction data generating section MPa and stored in the reproduction data buffer 2M by the reproduction data storage section MPb is described, for example, in the SMF (Standard MIDI File) format in accordance with the musical tone information format of the MIDI file MF, and

in the example in FIG. 8(a), is comprised of reproduction master track information CTr, score MIDI track (score track) information STr, MIDI track information MTr, and audio track information ATr. The video reproduction data
 5 generated by the video reproduction data conversion/storage section VP_a and stored in the video control data buffer 2V is also described in the SMF format, as shown in FIG. 8(b).

[0061]

10 The score track information STr is score reproduction data that is used itself in reproduction of a score. The MIDI track information MTr is MIDI reproduction data that is used itself in reproduction of musical tone information. That is, as shown in FIG. 9(1),
 15 the both types of track information STr, MTr are each comprised of pairs of MIDI clock timing MCp₁, MCp₂, ..., and MIDI events EVp₁, EVp₂, ... that should be generated in that MIDI clock timing, the pairs being arranged in the order of the MIDI clock timing. In the present
 20 embodiment, the score track information STr is generated by extracting display position information (such as DP₁₁ in the lower-right part of FIG. 4) of note/rest events (movable parts) from score reproduction data, that is, a score file SF_{ia} and converting the information into the
 25 MIDI clock timing. Such score track information STr is used to schematically display progress of performance of music tone information of the MIDI track information MTr in terms of movement of the cursor CL (see FIG. 7).

[0062]

30 On the other hand, the audio track information ATr is audio reproduction data that specifies reproduction start timing of sound wave information in terms of MIDI clock timing and designates audio files AF_{ia}, AF_{ib}, ... to be reproduced in MIDI clock timing. That is, as shown in
 35 FIG. 9(2), the audio track information ATr is comprised

of pairs of MIDI clock timing MCq1, MCq2, ..., and designated audio filenames AFq1, AFq2, ... to be reproduced in that MIDI clock timing, the pairs being arranged in the order of the MIDI clock timing.

5 [0063]

The respective MIDI clock timing MCq1, MCq2, ... are obtained by converting timing data Tm1, Tm2, ... of the audio file designation information Ad of the group data Gdjk to MIDI clock. The respective designated audio
10 filenames AFq1, AFq2, ... are copied from designated filenames Fn1, Fn2, ... of the audio file designation information Ad and therefore information that designate individual audio files AFia (the contents of which is shown in the second part of the right column in FIG. 4)
15 described above.

[0064]

As is the case with the track information ATr for audio reproduction data, the video reproduction data in FIG. 8(b) is track information VTr in which video files
20 are associated with MIDI clock timing. As shown in FIG. 9(3), the video track information VTr is comprised of pairs of a MIDI clock timing MCrl, MCr2, ..., and designated video filenames VFr1, VFr2, ... that are to be reproduced in that MIDI clock timing, with such pairs
25 being arranged in the order of the MIDI clock timing. In the same way as the audio track ATr, the video track information VTr is generated from the video file designation information Vd of the group data Gdjk. That is, the MIDI clock timing MCrl, MCr2, ... are obtained by
30 converting timing data Tm1, Tm2, ... of the video file designation information Vd to MIDI clock timing, and the designated video filenames VFr1, VFr2, ... are copied from the designated filenames Fn1, Fn2, ..., and therefore designate individual video files VFia (the contents of
35 which is shown in the third part of the right column of

FIG. 4).

[0065]

(3) MIDI Generation Processing by MIDI Reproducing Program Executing Section MP

5 FIGS. 10 and 11 are flowcharts showing the procedure of a MIDI generation process carried out by the MIDI reproducing program executing section MP as described above. When the MIDI generation process is started according to the MIDI reproducing program, first the
10 reproduction data generating section MPa of the MIDI reproducing program executing section MP reserves the reproduction data buffer 2M, which is an area for recording the reproduction data RD, in the processing buffer (RAM) 2 (step M1). Next, processing for detecting
15 file types (MF, AF, VF, SF) to be used in reproduction from the media designation information Md, Ad, Vd, and Sd of the designated group data Gdjk from the distribution processing section CPb is carried out (step M2).

[0066]

20 First, it is determined whether it has been detected that a MIDI file (MF) is to be used for reproduction, from the designated contents of the MIDI file designation information Md (step M3). Here, when a MIDI file (MF) is to be used for reproduction ("YES" to the step M3),
25 information on the master track CT in the MIDI file MFia designated by the MIDI file designation information Md is set as the master track information CTr of the reproduction data RD, and the master track information CTr is recorded in a master track of the reproduction
30 data buffer 2M by the reproduction data storage section MPb (step M4). Further, the master track information CTr information on the reproduction track RT in the MIDI file MFia is recorded in a MIDI track of the reproduction data buffer 2M as the MIDI track information MTr by the
35 reproduction data storage section MPb (step M5 in FIG.

11).

[0067]

When it is determined that no MIDI file (MF) is to be used for reproduction ("NO" to the step M3 in FIG. 10),
 5 master track information CTr is newly generated according to timing setting information in the control instruction information Cd and the generated master track information CTr is recorded in the master track of the reproduction data buffer 2M by the reproduction data storage section
 10 MPb (step M6).

[0068]

After the master track information CTr has been recorded (the steps M5, M6), it is determined whether it has been detected that an audio file (AF) is to be used
 15 for reproduction, from the designation contents of the audio file designation information Ad (step M7 in FIG. 11). Here, when it is determined that an audio file (AF) is to be used for reproduction ("YES" to the step M7), the audio file designation information Ad is read from
 20 the group data Gdjk (step M8) and MIDI clock timing data MCq1, MCq2, ... are generated from the timing data Tm1, Tm2, ... of the read audio file designation information Ad (step M9). Further, audio track information ATr comprised of the MIDI clock timing data MCq1, MCq2, ... and designated
 25 filenames AFq1, AFq2, ... is generated and recorded in an audio track of the reproduction data buffer 2M by the reproduction data storage section MPb (step M10).

[0069]

After the audio track information ATr has been
 30 recorded (the step M10) or when it is determined that an audio file (AF) is not to be used for reproduction ("NO" to the step M3), it is determined whether it has been detected that a score file (SF) is to be used for reproduction, from the designation contents of the score
 35 file designation information Sd (step M11). Here, when

it is determined that a score file (SF) is to be used for reproduction ("YES" to the step M11), score reproduction data RD is received from the score reproduction data RD generating section SPa of the score reproducing program
 5 executing section SP and the received score reproduction data is recorded in a score track of the reproduction data buffer 2M as the score MIDI track information STR by the reproduction data storage section MPb (step M12).
 After the recording processing for the score MIDI track information STR has been carried out (the step M12), the
 10 MIDI generation process is terminated. Also, when it is determined that no score file (SF) is to be used for reproduction ("NO" to the step M11), the MIDI generation process is terminated immediately.

15 [0070]

[Reproduction Operation]

During a reproduction operation, the performance information reproducing apparatus according to the embodiment of the present invention uses the reproduction
 20 data RD generated as described above during a setting operation to carry out synchronized reproduction of various performance information (media information) according to a MIDI file MF and other media files AF, VF, and SF in a reproduction manner corresponding to the
 25 contents of a management file MN. FIG. 12 is a functional block diagram [2] schematically showing functions of the performance information reproducing apparatus that are used during a reproduction operation according to the embodiment of the present invention.

30 [0071]

After the operation settings have been completed, when the user operates a reproduction switch RS on the page screen (see FIG. 7) using a predetermined operator of the operator device 11 to give an instruction for
 35 starting reproduction, a start instruction processing

section CPd of the management program executing section CP, which gives instructions for starting and stopping a reproduction operation of the performance information reproducing apparatus, instructs the MIDI reproducing
 5 program executing section MP to start reproduction and hence causes the performance information reproducing apparatus to start a reproduction operation.

[0072]

In the MIDI reproducing program executing section MP,
 10 responsive to this reproduction start instruction, a MIDI reproduction start processing section MPc, which gives instructions for starting and stopping operation of the MIDI reproducing program executing section MP, activates a MIDI clock source MC and a MIDI reproduction processing
 15 section MPd. The MIDI reproduction processing section MPd reads the reproduction data RD from the reproduction data buffer 2M in accordance with a MIDI clock from the MIDI clock source MC.

[0073]

20 That is, whenever each MIDI clock timing MCp1, MCp2, ... in the MIDI track information MTr of the reproduction data RD is reached, the contents of MIDI event data EVp1, EVp2, ... in the same track information MTr is outputted to the tone generator circuit 7 and the effect circuit 8 as
 25 musical tone information. At the same time, an operation start instruction is issued to a start/data transfer section MPe, and whenever each MIDI clock timing MCq1, MCq2, ... in the audio track information ATr and MIDI clock timing MCp1, MCp2, ... in the score track information STr
 30 of the reproduction data RD are reached, a designated audio filename AFq1, AFq2, ... and a score MIDI (cursor) event EVp1, EVp2, ... are sent to the start/data transfer section MPe.

[0074]

35 In accordance with control instructions from the

MIDI reproduction processing section MPd, the start/data transfer section MPe instructs the other type media files AP, VP, and SP to start and stop operations. When an operation start (activate) instruction has been issued, the start/data transfer section MPe sends the designated audio filenames AFq1, AFq2, ... and the score MIDI events EVp1, EVp2, ... respectively to the audio reproducing program executing section and the score reproducing program executing section AP, SP in the respective MIDI clock timing mentioned above. Also, in accordance with a reproduction start instruction from the MIDI reproduction start processing section MPC, a MIDI clock is transmitted from the MIDI clock source MC to the video reproducing program executing section VP.

15 [0075]

An audio reproduction processing section APa of the audio reproducing program executing section AP starts operation according to the activate instruction from the start/data transfer section MPe. Whenever each MIDI clock timing MCq1, MCq2,... is reached, one of audio files AFia, AFib, ... (based on the audio file designation information Ad of the page data Pdjk in the contents CFi) designated by a corresponding one of the designated audio filenames AFq1, AFq2, ... that have been received is read from the contents buffer 2C via an audio file reading section APb and an audio/video file read processing section CPe of the management program executing section CP, and the contents of the audio file AFia, AFib,... is outputted to the effect circuit 8 as sound wave information.

30 [0076]

A video reproduction processing section VPC of the video reproducing program executing section VP starts operation according to the activate instruction from the start/data transfer section MPe, reads video reproduction

data, that is, the video track information VTr, from the video control data buffer 2V in accordance with the MIDI clock from the MIDI clock source MC, reads a video file (VF) corresponding to the read video track information
 5 VTr, and transfers the video file to a video/score display processing section CPf of the management program executing section CP.

[0077]

That is, whenever each MIDI clock timing MCrl, MCr2,
 10 ... in the video track information VTr, STr is reached, the video reproduction processing section VPc reads out from contents buffer 2C one of video files VFia, VFib, ... (based on the video file designation information Vd in the page data Pdjk of the contents CFi) designated by a
 15 corresponding one of designated video filenames VFr1, VFr2, ... in the video track information VTr, STr via a video file reading section VPd and the audio/video file read processing section CPe, and outputs the contents of the video file VFia, VFib, ... to the video/score display
 20 processing section CPf as image information.

[0078]

A score reproduction processing section SPc of the score reproducing program executing section SP starts operation according to the activate instruction from the
 25 start/data transfer section MPe, and whenever each MIDI clock timing MCpl, MCp2, ... in the score track information STr is reached, outputs the contents of one of the received score MIDI (cursor) event data EVp1, EVp2, ... to the video/score display processing section CPf as movable
 30 score (cursor) information.

[0079]

The video/score display processing section CPf of the management program executing section CP displays
 35 images and a movable score (cursor) based on the image information and the movable score information received

from the video reproduction processing section and the score reproduction processing section VPc, SPc in respective display areas (windows) of the page (j) in the page screen. For example, for the first group (k=1) in the page screen in FIG. 7, in accordance with the movable score information, a cursor image CL representing the present musical tone performance position is displayed in synchronism with the reproduction operation. It should be noted that the display manner of the displayed movable score is not limited to a cursor image, it is also possible to use a method in which a flashing display is used for a note/rest image of a note or a rest being reproduced in the displayed score, or the color or luminance of the present note/rest image is changed for emphasis.

[0080]

Also, during reproduction and after the reproduction has been completed, if the user operates a stop switch SS on the page screen using a predetermined operator of the operator device 11 to instruct stop of a reproduction, the start instruction processing section CPd of the management program executing section CP issues an instruction to stop the reproduction operation of the performance information reproducing apparatus, so that the MIDI reproduction start processing section MPc of the MIDI reproducing program executing section receives the instruction and instructs the MIDI clock source MC and the MIDI reproducing program executing section MP to stop operation, so that the reproduction operation of the performance information reproducing apparatus is terminated. In this case, the reproduction operation can be restarted by another operation of the reproduction switch RS, or another contents (i), page (j), group (k) can be designated and a new setting operation can be carried out.

[0081]

[Another Embodiment]

Although in the embodiment described above, the video reproduction data (video track information) VTr out of the reproduction data RD is generated by the video reproducing program executing section, the MIDI reproducing program executing section MP may generate reproduction data RD including the video track information VTr. FIG. 13 is a functional block diagram [3] schematically showing functions of the performance information reproducing apparatus that are used in a setting operation according to another embodiment that is applied in such a case.

[0082]

In the performance information reproduction system according to the other embodiment, the video reproducing program executing section VP has the same construction as the audio reproducing program executing section AP. In the other embodiment, during a setting operation, the video reproduction data (video track information) VTr is generated and stored by the MIDI reproducing program executing section MP, so that as shown in FIG. 13, no data is distributed to the video reproducing program executing section VP from the distribution processing section CPb and no processing is carried out for contents data by the video reproducing program executing section VP. Accordingly, there is no need to reserve the video control data buffer 2V (see FIG. 12) in the processing buffer (RAM). 2 as in the previous embodiment.

[0083]

On the other hand, the reproduction data generating section MPa of the MIDI reproducing program executing section MP also generates the video track information VTr synchronous with MIDI clock timing based on the video file designation information Vd in the designated group

data Gdj_k in the management file MN_i, in the same way as the audio reproduction data (audio track information) ATr. That is, in the reproduction data generating section MP_a, date reproduction data RD including all of the media

5 track information MTr, ATr, VTr, and STr corresponding to all of the media files MF, AF, VF, SF is generated, as shown in an upper-left part of FIG. 13 (in which the same contents as in FIG. 9 are shown).

[0084]

10 Then, description will be made with reference to FIG. 12, during the reproduction operation of the performance information reproducing apparatus, the video reproduction processing section VP_c of the video program executing section AP receives an activation instruction from the

15 start/data transfer section MP_e, starts operation, receives the video track information VTr, and carries out the same operation as the audio reproduction processing section AP_a. Therefore, the video reproducing program executing section VP does not need to be supplied with a

20 MIDI clock from the MIDI clock source MC. (It should be noted that there are no other particular differences in structure from the example in FIG. 12.)

[0085]

That is, whenever each MIDI clock timing MC_{r1}, MC_{r2},

25 ... in the video track information VTr is reached, one of video file VF_{ia}, VF_{ib}, ... designated by the corresponding designated video filename VF_{q1}, VF_{q2}, ... sent from the start/data transfer section MP_e is read from the contents buffer 2C via the video file reading section (VP_d) and

30 the audio/video file read processing section CP_e of the management program executing section CP, and the contents of the read video files VF_{ia}, VF_{ib}, ... is outputted to the video/score display processing section CP_f as image information.

35 [0086]

[Various Embodiments]

Although the present invention has been described according to the certain embodiment, but it can be implemented in various ways. For example, although a
 5 single file is designated as each of the musical tone information and the score information for one reproduction part according to the first embodiment, a plurality of files may be designated as each of the musical tone information and the score file for one
 10 reproduction part. That is, if the MIDI file designation information and the score file designation information Md, Sd have the same structure as the audio and video file designation information Ad, Vd shown in the lower-right part of FIG. 3, it is possible to designate a plurality
 15 of MIDI files MFia, MFib, ... and score files SFia, SFib, ... (where "a", "b",... express individual files out of a plurality of files designated as the files MFi, SFi) for one reproduction part using the group data Gdjk for a single group. In this case, the MIDI clock timing (see
 20 FIG. 9) in the MIDI and score track information MTr, STr of the reproduction data RD corresponding to the MIDI files MFia, MFib, ... and score files SFia, SFib, ... are shifted by timing Tm1, Tm2, ... of the MIDI file designation information and the score file designation
 25 information, Md Sd.

[0087]

[Advantages of the Invention]

As described above, according to the present embodiment, without carrying out difficult processing
 30 such as specially generating various media information in advance so that the media information is reproduced in accordance with reproduction timing of musical tone information, when reproduction is carried out, the management file is used to easily generate reproduction
 35 data for reading the various media information and the

various media information can then be read out in accordance with the reproduction data only by setting read manners (filenames, timing, and the like) for various media information in advance in a management file.

5 As a result, synchronized reproduction of media information can be realized with ease. Further, an editing operation for a management file that specifies reproducing manners of the various media information is simple, so that by editing the management file, for
10 example, to change some of the data files or add new data files, or to change the reproduction timing of respective media files, it is possible to flexibly set a desired reproducing manner.

[Brief Description of the Drawings]

15 [FIG 1] FIGS. 1 are block diagrams showing examples of the entire construction of a performance information reproduction system according to an embodiment of the present invention.

[FIG 2] FIG. 2 is a block diagram showing the hardware
20 construction of the performance information reproducing apparatus according to an embodiment of the present invention.

[FIG 3] FIG. 3 is a diagram illustrating the exemplary structures of contents files used in performance
25 information reproduction and management data according to an embodiment of the present invention.

[FIG 4] FIG. 4 is a diagram illustrating the exemplary structures of respective media files (for one file) used
30 in performance information reproduction according to an embodiment of the present invention.

[FIG 5] FIG. 5 is a functional block diagram [1] schematically showing functions of the performance information reproducing apparatus in a setting operation mode according to an embodiment of the present invention.

35 [FIG 6] FIG. 6 is a flowchart showing a setting process

(browser process) carried out during a setting operation of the performance information reproducing apparatus according to an embodiment of the present invention.

[FIG 7] FIG. 7 is a view showing an example of a page screen displayed during a setting operation of the performance information reproducing apparatus according to an embodiment of the present invention.

[FIG 8] FIGS. 8 are diagrams showing an example of the overview of reproduction data RD generated during the setting operation of the performance information reproducing apparatus according to an embodiment of the present invention.

[FIG 9] FIGS. 9 are diagrams showing an example of the contents of the reproduction data RD generated during the setting operation of the performance information reproducing apparatus according to an embodiment of the present invention.

[FIG 10] FIG. 10 is a part of a flowchart showing a MIDI generation process carried out during the setting operation of the performance information reproducing apparatus according to an embodiment of the present invention.

[FIG 11] FIG. 11 is another part of the flowchart showing the MIDI generation process carried out during the setting operation of the performance information reproducing apparatus according to an embodiment of the present invention.

[FIG 12] FIG. 12 is a functional block diagram [2] schematically showing functions of the performance information reproducing apparatus that are used in a reproduction operation mode according to an embodiment of the present invention.

[FIG 13] FIG. 13 is a functional block diagram [3] schematically showing functions of a performance information reproducing apparatus according to a second

embodiment of the present invention that are used in a setting operation mode according to an embodiment of the present invention.

[Description of Symbols]

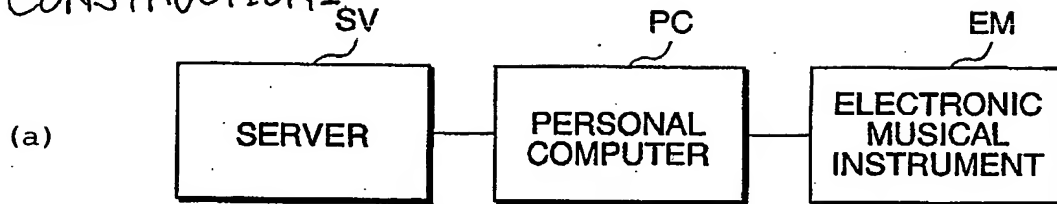
- 5 CF: CF1-CFn; CFi contents file
- MN: MN1; MNi management data
- PD1; PD2; PDj page data
- Gd: Gd11, Gd12; Gd21, Gd22; Gdjk group data
- MF: MF11, MF12; MFi; MFi1, MFi2 MIDI file (musical
- 10 tone information file)
- AF: AF11, AF12; AFi; AFi1, AFi2 audio file (sound
- wave information file)
- VF: VF11, VF12; VFi; VFi1, VFi2 video file (image
- information file)
- 15 SF: SF11, SF12; SFi; SFi1, SFi2 score file
- CP management program executing section
- MP, AP, VP, SP MIDI reproducing program executing
- section, audio reproducing program executing section,
- video reproducing program executing section, score
- 20 reproducing program executing section
- RD reproduction data



FIG. 1

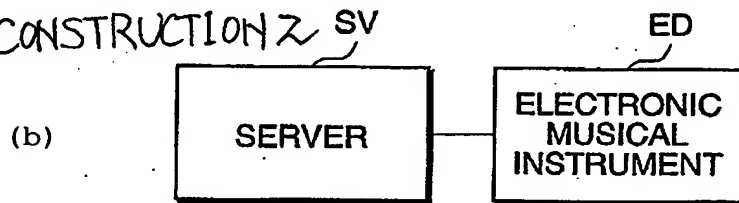
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EXEMPLARY CONSTRUCTION 1



MANAGEMENT PROGRAM
VARIOUS REPRODUCING PROGRAMS

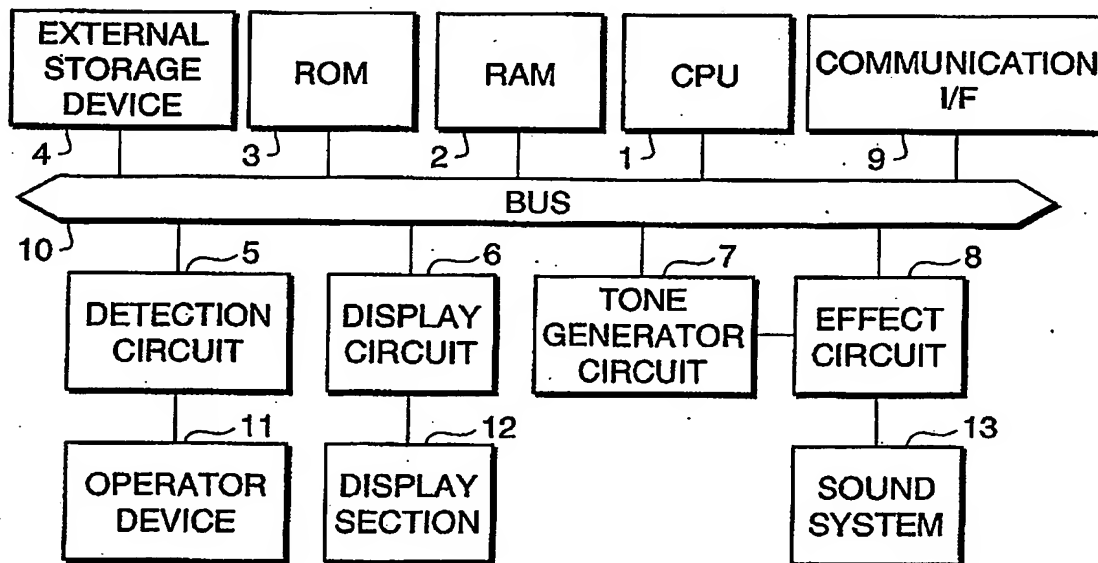
EXEMPLARY CONSTRUCTION 2



MANAGEMENT PROGRAM
VARIOUS REPRODUCING PROGRAMS

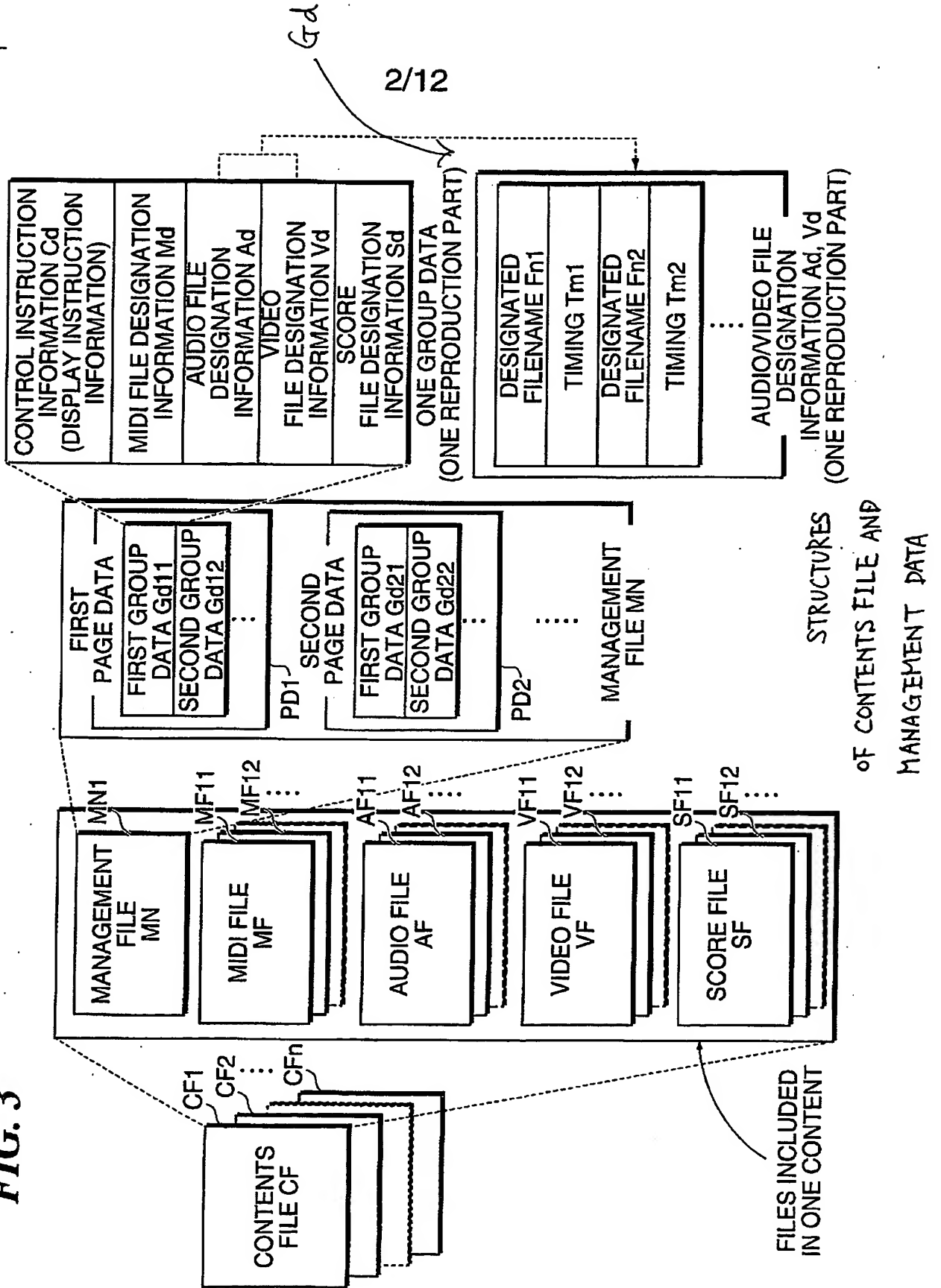
EXEMPLARY ENTIRE CONSTRUCTION
SYSTEM

FIG. 2



EXEMPLARY HARDWARE CONSTRUCTION OF PERFORMANCE INFORMATION
REPRODUCING APPARATUS (PC, ED)

FIG. 3



STRUCTURES
OF CONTENTS FILE AND
MANAGEMENT DATA

FIG. 4

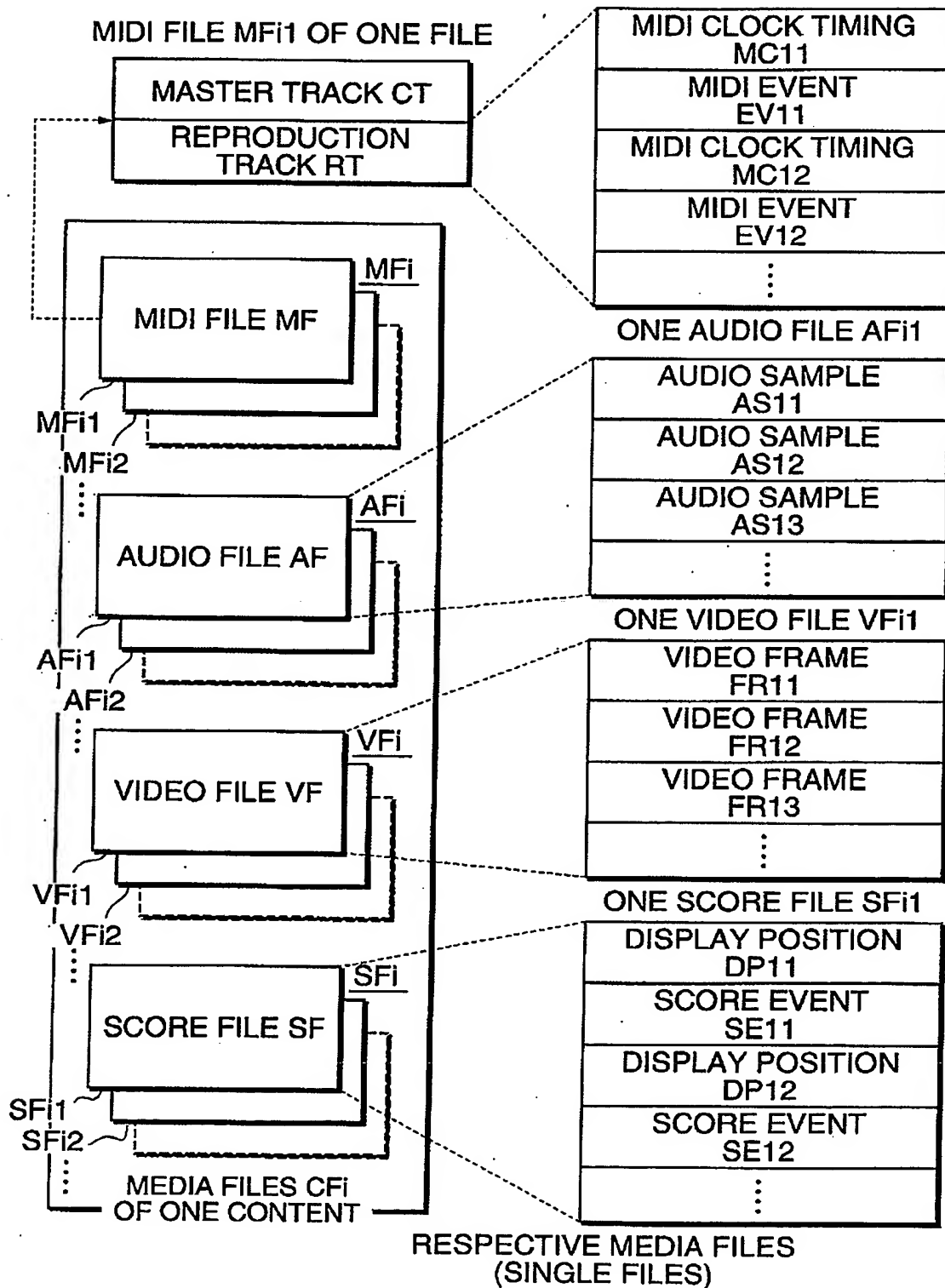
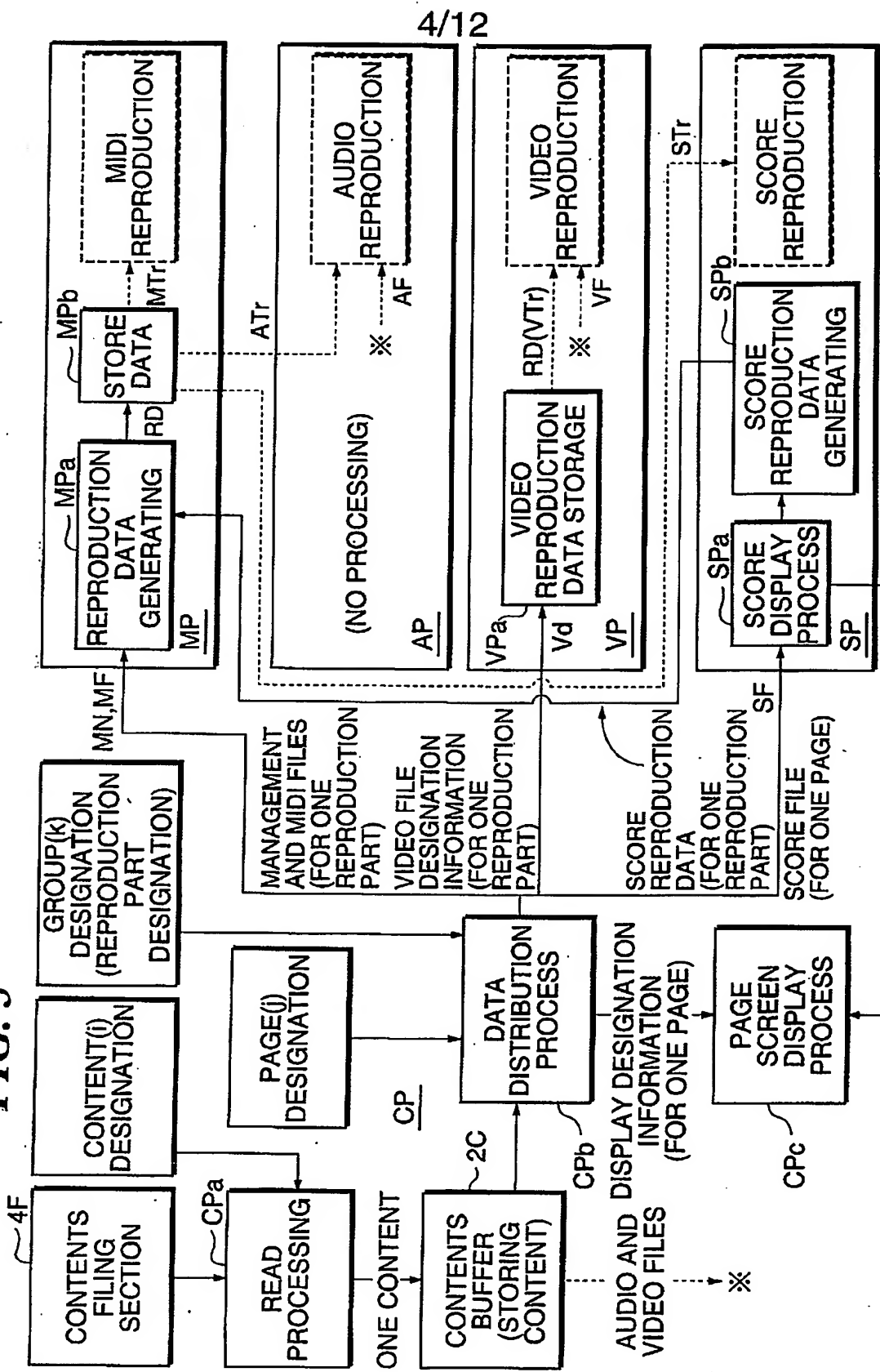


FIG. 5



FUNCTIONAL BLOCK DIAGRAM [1] (BROKEN LINES IN FIGURE SHOW FUNCTIONS DURING REPRODUCTION)

: IN SETTING OPERATION

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FIG. 6

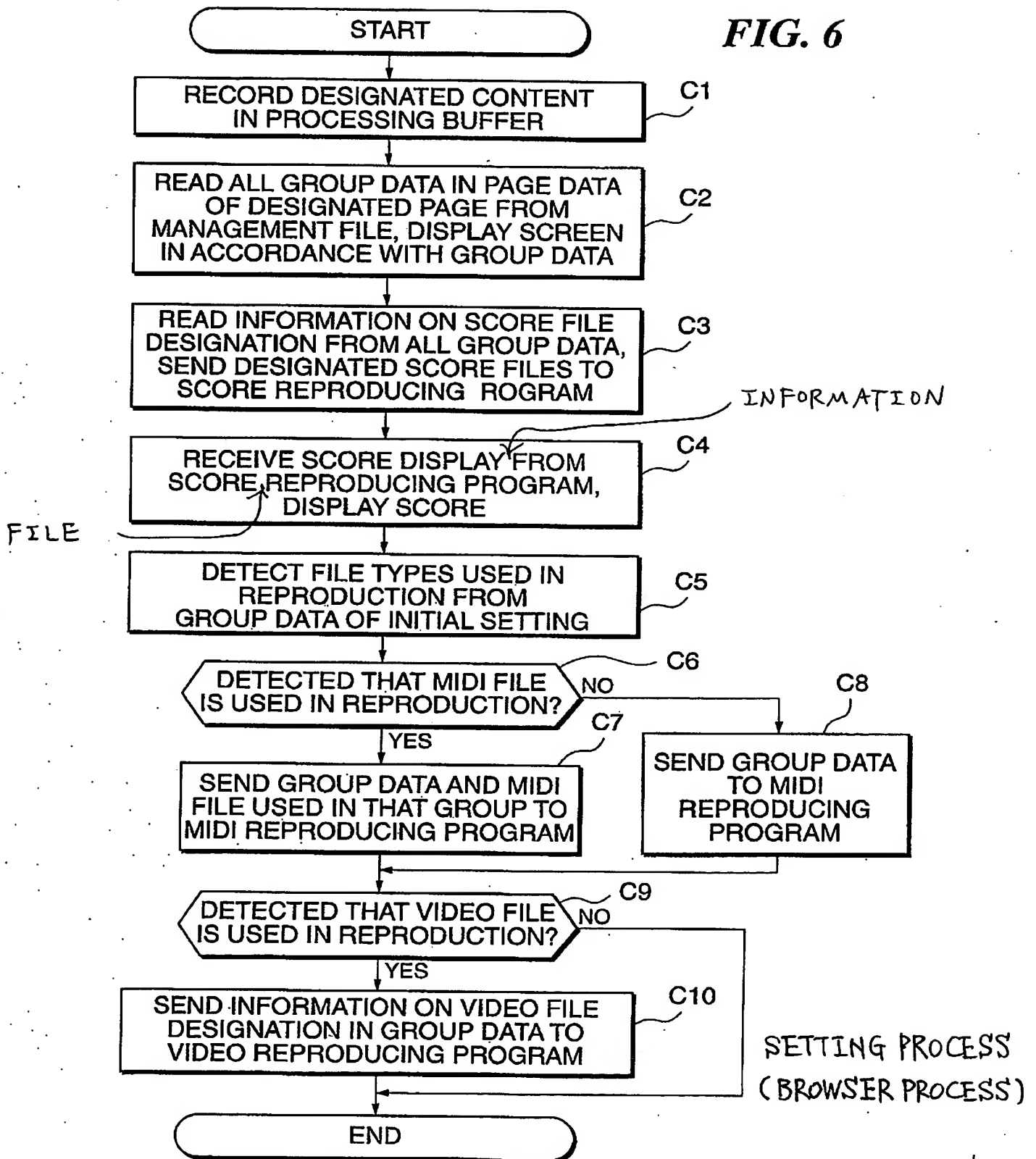
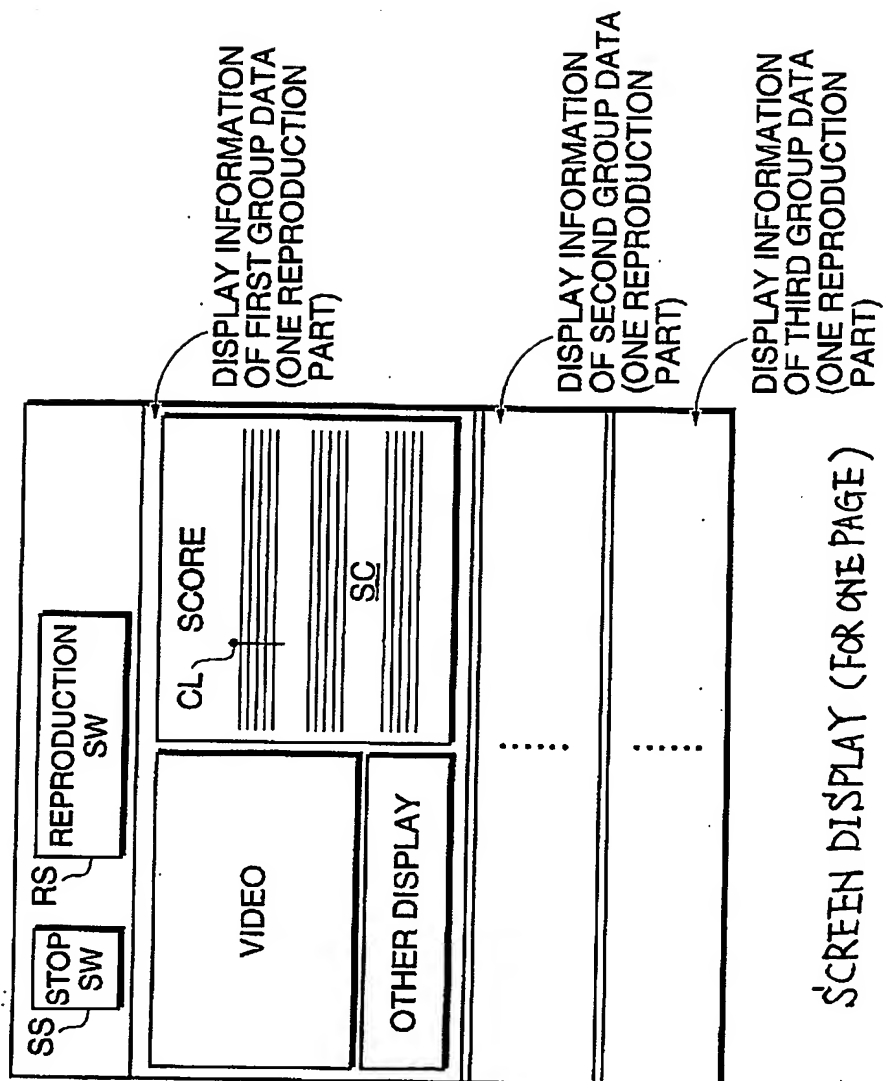
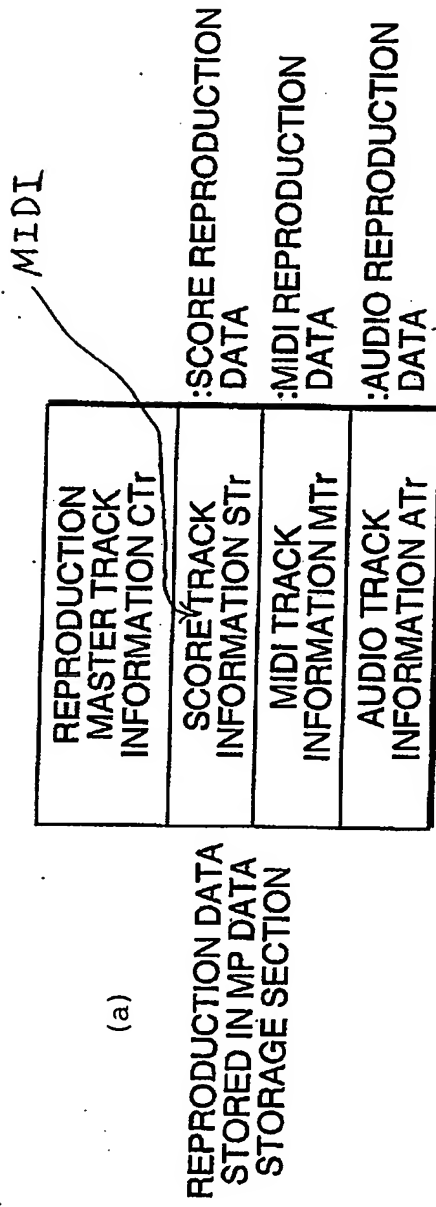


FIG. 7



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FIG. 8



(b)



REPRODUCTION DATA RD (SMF FORMAT)

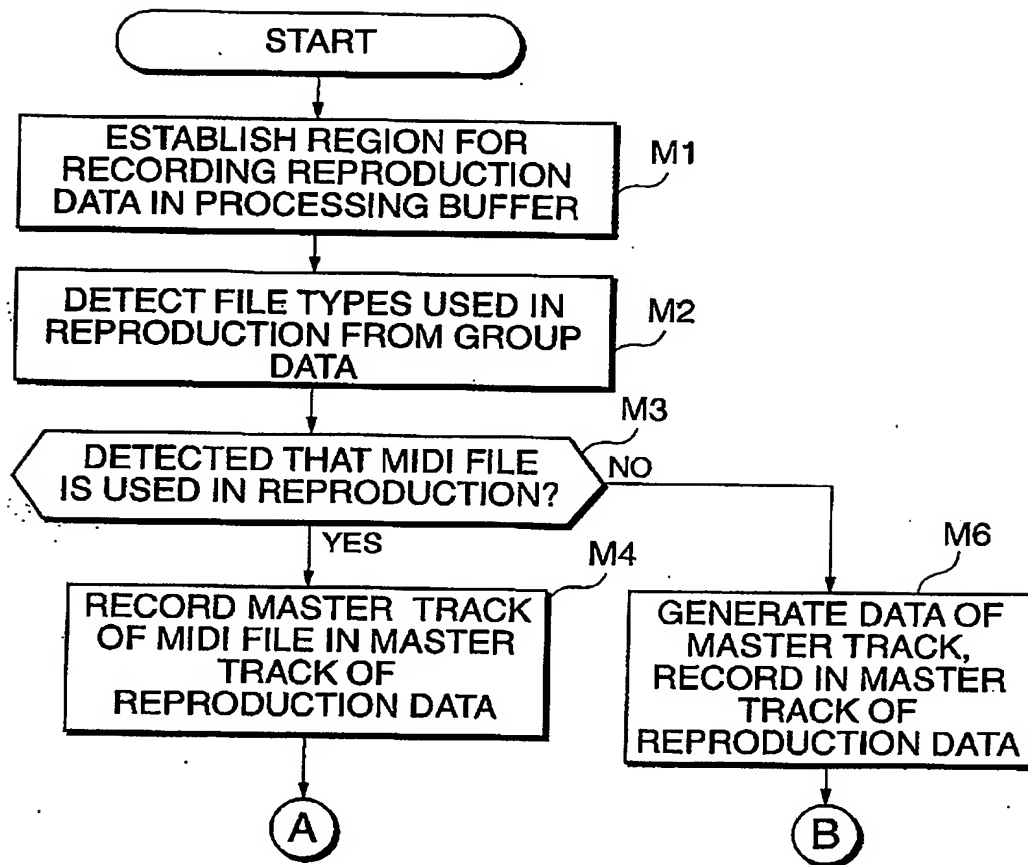
+

FIG. 9

(a)	(b)	(c)
MIDI/SCORE TRACK MTr, STr	AUDIO TRACK ATr	VIDEO TRACK VTr
MIDI CLOCK TIMING MCp1	MIDI CLOCK TIMING MCq1	MIDI CLOCK TIMING MCr1
MIDI EVENT EVp1	DESIGNATED AUDIO FILENAME AFq1	DESIGNATED VIDEO FILENAME VFr1
MIDI CLOCK TIMING MCp2	MIDI CLOCK TIMING MCq2	MIDI CLOCK TIMING MCr2
MIDI EVENT EVp2	DESIGNATED AUDIO FILENAME AFq2	DESIGNATED VIDEO FILENAME VFr2
⋮	⋮	⋮

CONTENTS OF REPRODUCTION DATA RD

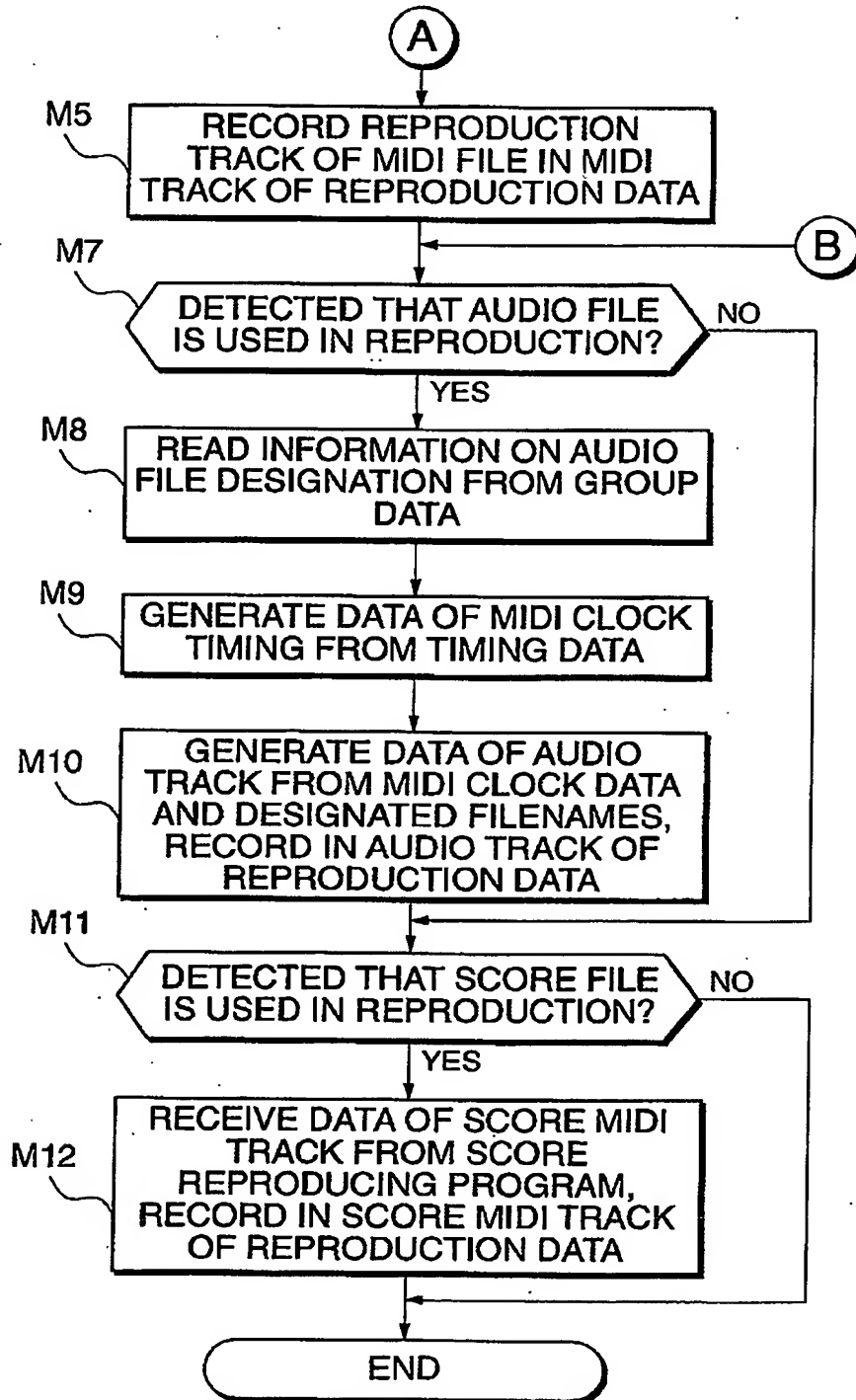
(EACH TRACK INFORMATION MTr, STTr, ATTr, VTr FOR ONE REPRODUCTION)

FIG. 10

MIDI GENERATION PROCESS [1]

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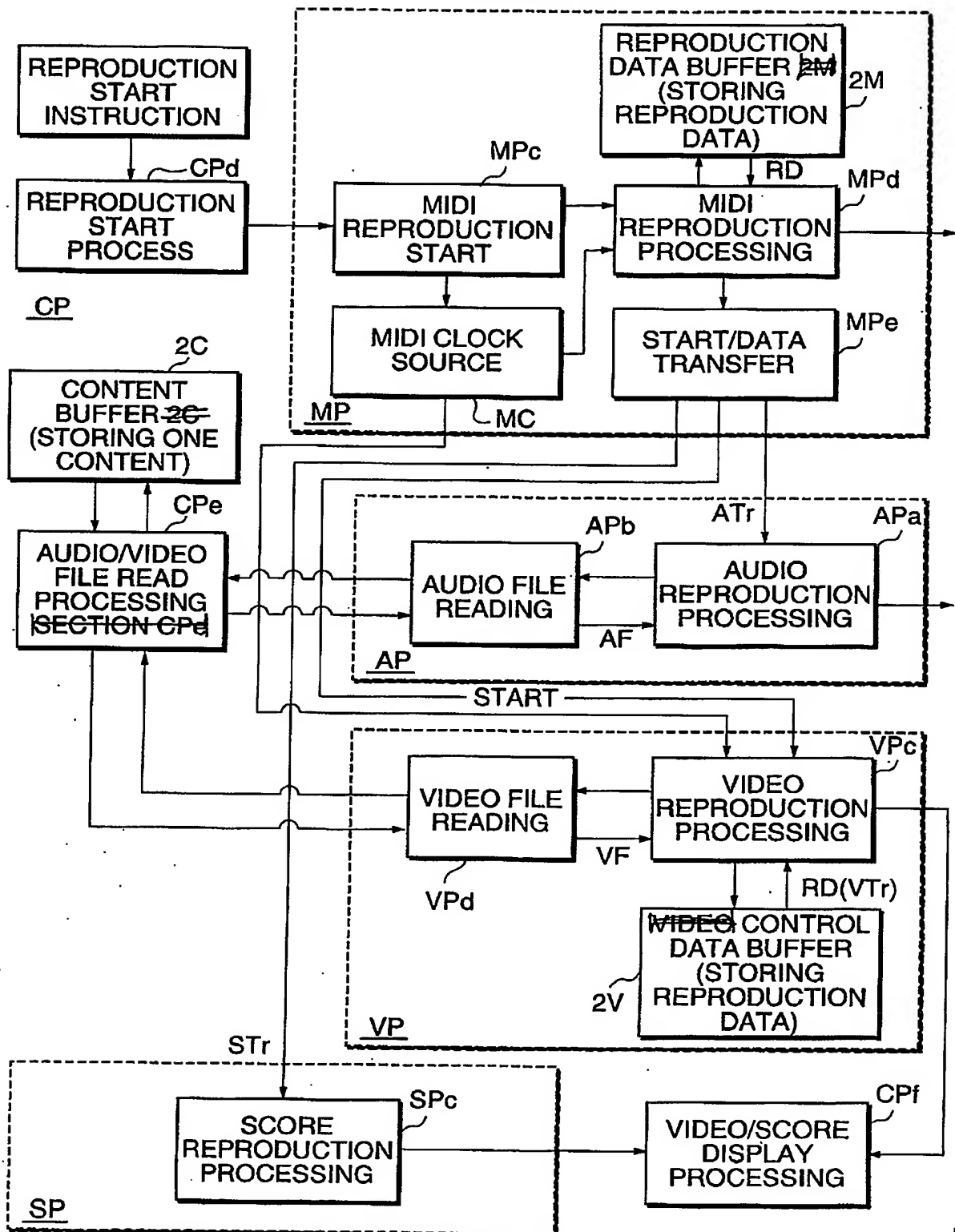
FIG. 11



MIDI GENERATION PROCESS [2]

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FIG. 12

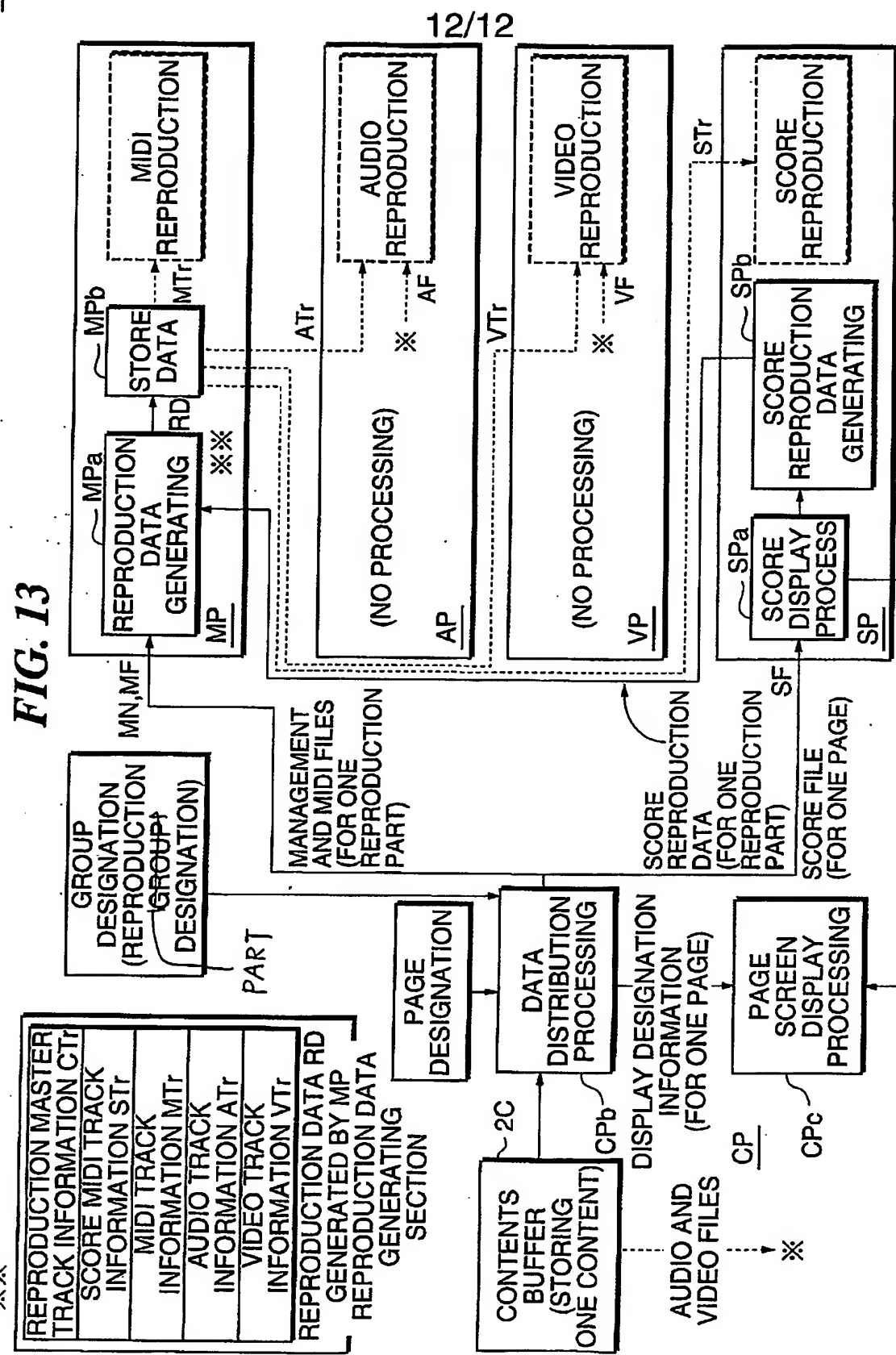


FUNCTIONAL BLOCK DIAGRAM [z] : IN REPRODUCTION OPERATION

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FIG. 13



FUNCTIONAL BLOCK DIAGRAM [3] (BROKEN LINES IN FIGURE SHOW FUNCTIONS DURING REPRODUCTION)

+ : IN SETTING OPERATION (ANOTHER EMBODIMENT)



[Name of the Document] Abstract

[Abstract]

[Problem to be Solved] To achieve easy generation of reproduction data and synchronized reproduction of a plurality of types of performance information.

[Solution] In a performance information reproduction system according to the present invention, various types of media information (performance information) data files MF, AF, VF, and SF are stored in the contents filing section 4F or the like together with management files MN that manage the reproduction manners of the data files MF-SF. Whenever synchronized reproduction of such media information is carried out, a reproduction data generating part MPa, etc. of a musical tone information reproducing program executing section MP generates, in accordance with the management file MN, reproduction data RD in the state for enabling musical tone data files and score data files MF, SF, and various other media data files AF, VF to be read out according to a musical tone information reproducing program. Then, reproducing parts of respective media information reproducing program executing sections MP, SP; AP, VP reproduce the musical tones and score information of the reproduction data RD and also the other media information of the data files AF, VF read out based on the reproduction data RD.

[Selected Drawing] Figure 5